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ON SPASTIC PARALYSIS AND SYPHILIS OF THE CORD.[1]

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As is well known, there are certain symptom groups which roughly characterize both cerebral and spinal syphilis, and while striking departures from these symptom groups are not infrequent, these departures in no way militate against the truth of this statement. However, the subject must be viewed in the broadest possible light. A comprehensive view alone will assign to special symptom groups their proper value and prevent the undue exaggeration of their relative importance.

The following cases bear upon the interesting question of the relation of syphilis to spastic spinal paralysis, and also indirectly upon the question of Erb's form of spinal syphilis, and they are for this reason placed upon record:—

CASE I.—A. S., male, single, white, German, aged thirty-eight, baker by occupation, was admitted to the nervous wards of the Philadelphia Hospital, June 16, 1902, suffering from a weakness of the left arm and leg.

No family history of importance could be elicited. Both parents were dead. Patient had two brothers, but knew nothing of their medical history.

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[1] Read at the meeting of the American Neurological Association, September 15, 16 and 17, 1904.

Personal History.—Had measles but no other diseases of childhood. Had gonorrhea at thirty-six years of age. Did not know whether he had had syphilis, but admitted frequent exposure.

History of Present Disease.—On Thursday, February 6, 1902, while at work he suddenly became dizzy. He had dimness of vision, and the right leg became weak—the leg, however, did not become paralyzed. He did not fall nor did he lose consciousness. He went to bed, and in two days had improved so much that he was able to get up and be about. On the following Sunday, however, he again suffered from an attack of dizziness. This attack was followed by loss of the power of speech, and for a time by inability to swallow; there was also marked weakness of the left arm, and to a less extent in the left leg. As before, he did not become unconscious. States that his mouth was drawn to the left. Loss of speech persisted for about three days and then entirely disappeared. Loss of power in the left arm and leg, however, has persisted up to the present time.

At the time of admission it was noted that he had some loss of power of the left arm and left leg. Both knee-jerks were plus, the right being slightly greater than the left. Ankle clonus and plantar clonus were elicited upon both sides. The Babinski sign was present upon both sides. The left biceps jerk was also plus. Some wasting was noted in the interosseous muscles of the left hand. The left leg also showed some atrophy. The pupils were equal, and reacted in a normal manner to light and accommodation; both were slightly dilated. The tongue deviated slightly to the right side. No sensory losses were noted. The general visceral examination was negative.

June 19, 1902, the following notes were made: The right leg and foot can be moved in all directions, with a good degree of strength. With the left leg all movements can be made, but not so well as with the right side; flexion and extension of the toes and foot are especially defective. The right arm can be moved with normal strength in all directions. The left arm is held with the forearm flexed upon the arm, and the fingers flexed upon the hand. The only movement the patient can make with this member is slight flexion of the forearm upon the arm. Slight rigidity of the left leg is noted when passive movement is made. Marked rigidity of the left arm is also present. The mouth is slightly drawn to the left, but when voluntary effort is made is moved better to the right than to the left. When the patient smiles no difference is noticed. The tongue is protruded slightly to the right; the patient can move the tongue from side to side, but cannot move it to the left as well as to the right; no fibrillary tremor is noted. There is apparently a weakened action of the pterygoids and masseters. There is no difficulty in chewing. There is no paralysis of the occipito-frontalis, nor of the corrugator supercilii. There is no ptosis. The patient seems to be unable to completely close the eyes on either side; forcible efforts to do so cause rapid tremor of both eyelids. The pupils are equal and react to light, but somewhat sluggishly; they react well to accommodation. The eyeballs can be moved well in all directions.

On the right side the plantar reflex is very active; the toes are first flexed and then extended. On the left side the plantar reflex does not seem to be as active as on the right; there is slow extension and separation of all the toes. The quadriceps jerk is increased, there is marked ankle clonus and slight patellar clonus on both sides. Both knee-jerks are plus, the left being the greater. The tendon jerks of the right arm are present and slight in degree. On the left side they are exceedingly active. A jaw jerk is also present. The cremasteric reflex is present, and is exceedingly active on the right side and rather sluggish on the left. The abdominal reflex is apparently a little more active on the right side than on the left.

The circumference of the left thigh is about a half inch less than that of the right at levels of eight and fourteen inches respectively below the anterior superior iliac spine. The muscles of the leg are more flabby than those of the right.

In both hands there is wasting of the adductor pollicis and interosseous muscles — more marked on the left side. The left arm, three inches below the olecranon process, is one inch less in circumference than the right arm at the same level. The left upper arm also measures an inch less than the right. There is also wasting of the left deltoid as compared with the right, and of the left supra- and infra-spinatus muscles as well as of the pectoral muscles. The myotatic irritability of the muscles of the left upper extremity is much increased. Fibrillary tremors are noted in the adductor pollicis and interossei muscles. There is no disorder of the sphincters. For three or four days the patient has had pain off and on over the right shoulder blade.

Speech is thick and indistinct; this he says is different from what it used to be. There are no sensory losses of the cutaneous surface; no loss of muscle sense; no loss of the sense of position. The feet and hands are cold; the left hand is slightly livid.

Reexamined on June 21, it is found that his station is very insecure, that he stands with both legs wide apart, that he is able to walk a few steps, but does so with great difficulty. The gait is not typically hemiplegic; the right leg is used comparatively well, but the left is pushed forward with some effort.

Reexamined on July 16, it is noticed that the right leg is somewhat weaker than before. Patellar clonus is present and marked upon both sides. Otherwise no change is noted.

An examination of the eye grounds by Dr. Crosky revealed contracted arteries, dilated veins and slight hyperemia of the left disc. There are no signs of neuritis, of atrophy or of extravasation.

Re-examined on the 15th of August, it is found that faradic contractility is somewhat diminished in the adductor pollicis and the interossei muscles of the left hand.

Examined October 16, it is found that there has been an appreciable change in his symptoms. It is found that while he can now flex and extend the right leg, the movements are awkward and distinctly ataxic. This is also true of the movements of the right arm. The left leg on the other hand is now distinctly spastic, and the movements of the limbs are decidedly restricted because of muscular rigidity. There is also marked rigidity of the left arm, the forearm and fingers being in a position like that of secondary contracture in hemiplegia. The left angle of the mouth is slightly depressed, the left side of the face is slightly flattened, while the left eyeball occasionally drops outward as though from weakness of the right internal rectus. The occipito-frontalis muscle apparently acts normally upon the right side; upon the left side its action is evidently diminished. The left brow is relatively smooth. The left zygomatic muscles are distinctly weak; the left angle of the mouth is not retracted as well as the right. As regards the trunk it is found that the left pectoralis major is firmly contracted, while the right is normal. The abdominal muscles and the muscles of the back of the trunk are apparently normal.

On October 17 the following note was made: While attempting to walk in the ward the patient suddenly became dizzy and fell, receiving a cut on his forehead above the right eye. Two stitches were required to approximate the edges of the wound. It was noted subsequently that his speech was not as good as before. There was also a slight rise of temperature and some general weakness.

On the 18th it was noted that the knee-jerks were equally pronounced upon both sides. Attempts at passive movements of the legs induced marked rigidity. Persistent ankle clonus was noted upon the right side, but not upon the left. A Babinski sign was now noted upon both sides. Sensory loss could be nowhere detected; tactile, thermal and pain sense were equally well preserved. There was no loss of the sense of position.

Eye examination by Dr. de Schweinitz, October 29.

Both discs are now distinctly degenerated, giving the appearance of a low grade interstitial neuritis. The veins are very full and the arteries contracted. The reaction of the pupils to light is normal, there is no diplopia. Rotation of the eye balls is normal; there is partial paralysis of both orbiculares palpabrarum, the patient being unable to completely close the eyes.

Re-examined on November 22, it is noted that since the last examination (made about a month ago) his condition has become much worse. His voice is weaker and more indistinct; he is now unable to remain out of bed; when sitting in a chair falls over. He makes no complaint. His face has a mask-like appearance; he is still unable to close the eyelids completely, and when he makes an effort to do so the palpebral fissure on each side remains open for from one-eighth to one-quarter of an inch. He has much difficulty in showing his teeth, and does it very imperfectly; cannot draw the corner of the mouth up on either side. The tongue deviates well to the right when protruded, and is unusually thin, but equally so on both sides and shows no fibrillary tremor. The pupils are equal, possibly the left is a little larger than the right. The irides react promptly to light. The movements of eyeballs are normal in all directions; no nystagmus.

Every now and then during the examination there are contractions of the facial muscles, such as occur in laughter, and this he does without having anything to amuse him.

He can move the right upper limb freely, but the movement is ataxic, and he has distinct difficulty in placing the first finger of the right hand on the end of the nose.

The left upper limb is paralyzed, and he can move it very slightly at the left elbow and in the left fingers. Contracture of the left elbow and fingers is very marked. Biceps tendon, triceps tendon, wrist reflexes in left upper limb much exaggerated. These reflexes in right upper limb slightly exaggerated. Sensation for pain is preserved in both upper limbs over the trunk and in the face; accurate studies of sensation can, however, no longer be made because of the mental condition. Has incontinence of urine and feces. The left lower limb is paralyzed; there is contraction in extension, and it is impossible to flex the left leg passively at the knee. The patellar reflex on the left side is exaggerated, but no movement can be obtained of the leg because of the contracture. The patellar reflex on the right side much exaggerated. Ankle clonus distinctly present on each side. Babinski reflex very marked on each side; the big toe is moved promptly upward. Sensation for pain preserved in the lower limbs.

December 26, 1902. Is unable to raise himself in bed. Can, however, turn over on his left side by grasping the rail of his bed with the right hand. Says he is comfortable and has no pain. Closes his eyes more incompletely than before; the palpebral fissure of the right side now remains open for about one-third of an inch, the left for about one-quarter inch. Has less power to show his teeth than before: both angles of the mouth can be feebly retracted, the left less than the right. When laughing the angles of the mouth are retracted much better and equally. The tongue is protruded only slightly and with difficulty; it deviates markedly to the right. There is no change in pupillary phenomena or ocular movements. The patient moves the right arm in various directions, but the movements are ataxic and jerky, the grip is very weak. Cannot move the left upper extremity except to make faint flexion movement at the elbow. There is no motion of the hand or fingers. Contracture of shoulder, elbow, wrist and fingers is present, as at previous examination. Reflexes, sensation and sphincters as before. He is able to move the right leg feebly in various directions, also the foot and toes. He is also able to move the left leg feebly, flexing it slightly at the knee. The left leg can now be flexed passively at the knee; it is not quite as rigid as at the last examination.

January 21, 1903. The patient has for the last twenty-four hours shown signs of failure, is unable to take nourishment and can only be roused with difficulty.

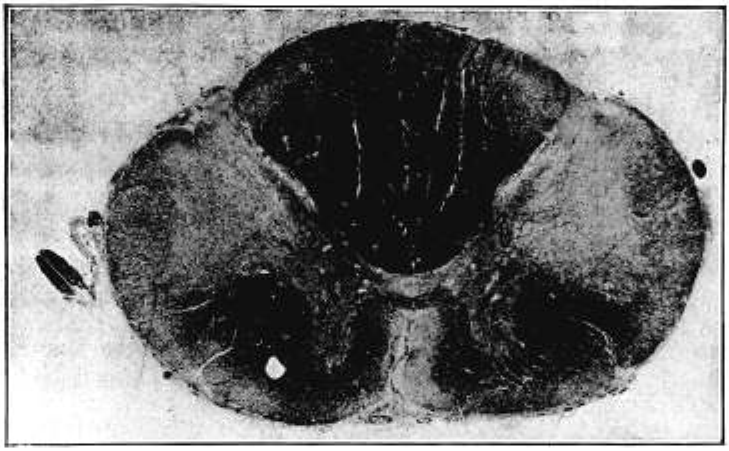

Fig. 1.—Transverse section of cervical cord in Case I., showing predominance of lesion in pyramidal tracts, direct and crossed.

January 22, 1903. Rise of temperature, 101.8 degrees.

January 23, 1903. Shows general and increasing failure. The pulse small and very rapid. The respirations are normal in frequency; the lungs are clear throughout. There is no distension of the abdomen. Temperature 100 degrees.

January 24, 1903. To-day the patient has shown very marked signs of weakening; cannot be aroused at all. The respirations are rapid, the pulse 180 and very small. It has not been possible to elicit a cause for his condition other than exhaustion. Rapid rise of temperature to 105 degrees; death.

Summary.—Sudden loss of power in right leg; sudden loss of power in left arm, and to a less extent in left leg. Rapid recovery of right leg; persistence of weakness in left arm and leg. Later recurrence of loss of power in right leg; involvement of right arm. At first no rigidity; later on rigidity established. Thenar and interosseous wasting in both hands, most evident in left; some wasting of left thigh. Tendon jerks plus; ankle clonus present; later Babinski sign on both sides. Bladder at first not involved, later on incontinence. No sensory losses. Gradual mental deterioration.

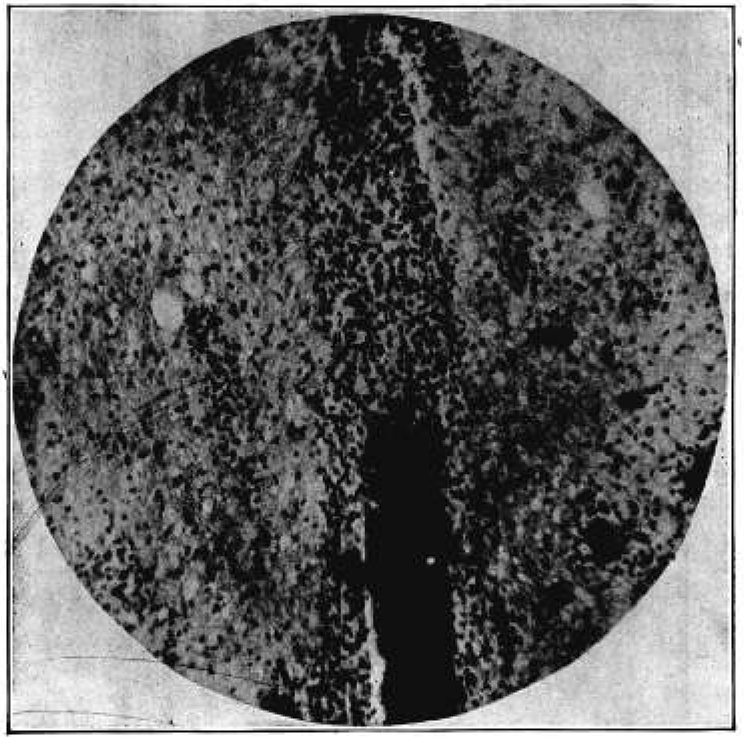

Fig. 2.—From Case I., showing inflammatory infiltration in pyramidal tract.

January 28, 1903—*Autopsy.*—This, unfortunately, had to be limited to the removal of the brain and cord.

Gross examination of the brain and cord revealed evidences of disease of the pia-arachnoid; opacities and thickening. No lesions whatever could be detected, either in the capsules or basal ganglia.

Microscopical Examination—Lumbar Cord.—Meningitis and vascular infiltration pronounced; moderate peripheral infiltration; marked infiltration and degeneration of the pyramidal tracts.

Dorsal Cord.—Meningitis and vascular thickening more pronounced. Moderate peripheral infiltration most marked anteriorly and laterally; hardly perceptible in posterior columns. Crossed pyramidal tract infiltration and degeneration very decided.

Cervical Cord.—Moderate meningitis and infiltration and thickening of vessel walls. Moderate general peripheral infiltration least marked in postero-lateral and postero-median columns. Very pronounced infiltration and degeneration in both crossed pyramidal tracts and in left direct pyramidal tract; slight degeneration in right direct pyramidal tract. The changes in the pyramidal tracts are greatly in excess of the other changes in the cord. The antero-lateral and antero-median groups of cells in the anterior cornua appear to be diminished in number upon both sides.

The degeneration of the motor tracts can be traced as far upward as the anterior pyramids, but not beyond; a small independent area of degeneration is noted in the inner third of the right crus, but the pyramidal fibers are intact upon both sides. The medulla and pons reveal meningeal and vascular involvement, moderate in amount. Similar changes are also noted in sections of the cortex, though they are here less pronounced than elsewhere.

Case II.—J. M., male, single, white, Austrian, age thirty-eight, sailor, was admitted to the nervous wards of the Philadelphia Hospital September 24, 1902. The memory of the patient is defective, and he is evidently somewhat confused. No family or personal history can be obtained. In reply to questions he admits alcoholism and veneral disease.

There is present decided paresis of the lower half of the left side of the face. The tongue is protruded in the median line. There is marked paresis of the left arm, with some rigidity at the elbow and shoulder and contracture and rigidity of the left wrist and fingers. The movements of the right upper extremity appear to be normal.

The right leg is almost completely paralyzed; the patient, however, can make faint movements with the toes. The left leg also presents a marked though less complete loss of power; the patient can elevate it from the bed but cannot hold it up long. He moves the toes of this foot freely. There is present also incontinence of the bladder and bowels.

The jaw jerk is slightly increased. The right biceps and triceps jerks are increased. The right wrist jerk is present and pronounced. The right knee jerk is likewise present and not exaggerated. There is present a right disappearing ankle clonus. The Babinski sign is also present upon the right side. The left biceps and triceps jerks are much increased, as is also the left wrist jerk. The left knee-jerk is present and decidedely exaggerated. There is present a faint left ankle clonus. The Babinski sign is also pronounced and decided upon the left side. A tendon Achilles jerk is present upon both sides. Cremasteric and abdominal reflexes are present but sluggish. There is no loss of sensation. There is no pain or tenderness along any of the nerve trunks, nor are there any vasomotor symptoms. The speech is somewhat long drawn and indistinct. The tongue is deviated slightly to the left and tremulous. There is no involvement of phonation. The patient apparently does not hear as well with the left ear as with the right, but there is no decided deafness.

The pupils are unequal; the left being the larger. Both pupils fail to react to light. There is no paralysis of the external ocular muscles.

The patient complains of pain in the right chest. There are present bronchial breathing and moist rales. Heart sounds are dull and distant. The pulse is slow and weak, though regular.

Examined October 18, 1892. The left knee-jerk as before is exaggerated. There is present a faint left ankle clonus. The right knee-jerk continues to be normal. A Babinski reflex is present upon both sides, but not quite as marked as at the previous examination. The right arm is flaccid, the right leg is flaccid. The left arm is less rigid than upon admission, though decided resistence to movements is still present at the elbow. The wrist and fingers are less rigid than at the first examination. Otherwise there is no decided change. The patient is evidently growing weaker. There is a slight rise of temperature. Pulse is rapid, while the breathing is stertorous. The patient is now quite stuporous.

The examination of the urine reveals the presence of some hyalin and a few granular casts with a small quantity of albumin.

Death occurred October 20.

Summary.—Paresis of left arm, very marked paralysis of right leg, paralysis of left leg. Tendon jerks of arms, especially of left, exaggerated. Right knee-jerk not exaggerated, left knee-jerk plus. Faint left ankle clonus. Disappearing right ankle clonus; Babinski sign upon both sides. Rigidity, later flaccidity. No sensory losses. Incontinence.

Autopsy.—The visceral changes noted were chronic pleurisy and a pronounced nephritis. There was also a syphilitic scar upon the liver.

The spinal dura appeared to be adherent to the anterior surface of the bony canal. This was most marked in the lumbar region. The pia mater of the brain was thickened and infiltrated upon either side of the longitudinal fissure and over the vertex generally. Otherwise the brain presented no striking peculiarities upon gross examination.

The skull presented over the occipital protuberance an extensive periostitis with some roughening of the bone. In the left frontal region also there was a slight depression of the external table.

Microscopical Examination—Lumbar Cord.—Marked meningitis and thickening of vessels. Marked infiltration of the pyramidal tracts; moderate infiltration of postero-median columns, slight general peripheral infiltration.

Cervical Cord.—Marked thickening of pia and infiltration of vessel walls. Moderate general peripheral infiltration. Marked infiltration of right crossed pyramidal tract and of left direct pyramidal tract. Infiltration of left crossed pyramidal tract, less marked than in its fellow. Faint involvement of right direct pyramidal tract. Slight involvement of direct cerebellar tract upon either side; faint involvement of posterior columns. The changes predominate greatly in the pyramidal tracts.

Case III.—P. N., single, white, German, hatter by occupation, age sixty-six. Was admitted to the Philadelphia Hospital on September 20, 1901.

Complains of pains in the legs, right side of the body and of difficulty in walking. Mental condition poor.

No satisfactory family or personal history can be elicited. Alcoholism and venereal diseases admitted.

It appears that the present trouble began some two years ago with pains in the legs and thighs, and that it has gradually grown worse. He first noticed numbness and stiffness in the legs about a year ago, but this only lasted for a short time. It came back at intervals, and four weeks ago he was obliged to use a cane in walking. About a week previous to admission was obliged to go to bed, being unable to walk because of pains and jerking in his legs.

Present Condition.—His general appearance is that of a well developed but rather poorly nourished man. The ninth, tenth and eleventh dorsal vertebræ are unusually prominent, and he complains of pain when pressure is made over them. He says at times that he has pain in this region when walking. The patient is able to make all movements with his legs, but the movements are weak. There is no rigidity, the muscles are flaccid, and there is no atrophy. The knee-jerks are increased upon both sides. Ankle clonus is absent upon both sides. Babinski sign is present and marked upon both sides. Achilles jerk is absent. There is a fair degree of strength in both upper extremities. They are apparently not involved. There is no involvement of the muscles of the face or of the tongue. The extraocular movements are well performed. The pupils are unequal, the right being contracted and yielding no response either to light or accommodation. The left pupil on the other hand is apparently normal, and responds to light and accommodation. The patient says that his arms have grown somewhat smaller lately. No marked atrophy of any special muscle or groups of muscles can be detected; however, the infra- and supra-spinatus muscles seem to be somewhat wasted, as do also the latissimi dorsi. Fine fibrillary tremors are noted in all of these muscles. There is a coarse intention tremor of both hands.

The patient complains of a sharp lancinating pain, extending down the legs. The pains are worse toward evening. The patient states that the pains are attended by spasm of the muscles, which cause him to kick his feet about. He also complains of delay in micturition. No anomalies of sensation can be detected. The speech is rather slow and deliberate, but not really abnormal.

Reexamined May 6, 1902, it is noted that the patient has a slow and slightly spastic gait. There is no involvement of the upper extremities. An intention tremor is noted as before. The knee-jerks are both much exaggerated. A patellar clonus is present upon both sides. The Babinski sign is present and pronounced as at the previous examination. An Achilles jerk is also present and pronounced. No ankle clonus is present upon either side. Pain is elicted upon pressure over the lower dorsal and upper lumbar spine. The possible deformity noted at the previous examination cannot be confirmed. Sensation as before is normal. The wasting of the infra- and supra-spinatus muscles noted at previous examination, is evident as before. The movements of the arms are performed normally. The biceps jerk is now decidedly increased on both sides.

Reexamined on December 11, 1902. There is no facial palsy or asymmetry. The tongue seems small and is protruded with some difficulty. The arms now reveal marked wasting. In the right arm there is a general wasting of the upper arm and of the forearm. It is more marked in the flexor groups than in the extensors. There is also decided wasting of the thenar and hypothenar eminences, with a less marked wasting of the interosseous muscles. Bicipital, tricipital and wrist jerks are present and exaggerated. In the left arm there is a wasting of the upper arm, not quite as marked as in the right. There is some wasting of the muscles of the forearm, especially in the flexors. The palm of the hand is decidedly hollow; there is some wasting of the thenar eminence and a less marked wasting of the hypothenar eminence. The reflexes are plus as in the right arm.

In the right lower limb the thigh is decidedly wasted, the adductor group being somewhat better preserved than the other muscles. There is a general wasting of the lower leg, though this is not excessive. In the left lower limb the thigh is wasted in a similar manner as the right, and the wasting is more pronounced. The left leg, in keeping with this, is somewhat more wasted than its fellow. The reflexes continue as at previous examination.

The pupils are unequal, the left being the larger. The latter does not respond to light, while the right reacts in a normal manner.

An examination of the urine reveals pus cells, granular casts and albumin and a specific gravity of 1020.

The man presented no visceral signs of moment or any notable changes of temperature until May 26, when it rose to 100 degrees, then fell to normal and continued so until November 28, when it rose to 100.4 degrees. It subsequently again fell to normal until the afternoon of the 30th, when it rose to 102 degrees, and remained at this figure during the night. On the morning of January 1, 1903, it fell back to normal, and continued so until the morning of the 3d, when it rose to 101.4 degrees, and then to 104.2 degrees, and subsequently fell back again to normal until the 7th instant, when it rose again to 104.2 degrees, and remained high until the evening of the 8th. Subsequently it fell again, and fluctuated from 100 to 102 until death set in. Death finally occurred as a result of nephritis on the 11th of January, 1903.

Summary.—Pains in legs, pain referred to lower dorsal spine; weakness of both legs. Gait spastic. Knee-jerks plus. Babinski sign upon both sides. Upper extremities not involved. No sensory losses. Delayed micturition. Later some atrophic changes in arms and legs.

Autopsy.—The principle changes noted were marked degenerative changes, arteriosclerosis, chronic endocarditis and chronic nephritis. There was also a hypostatic pneumonia. The brain and spinal cord revealed little change to gross examination.

Microscopical Examination.—Marked meningitis and thickening of vessel walls. General peripheral infiltration and degeneration, especially in the pyramidal tracts of either side; less marked changes are noted in the postero-median and postero-lateral columns.

Cervical Cord.—Moderate thickening and infiltration of the pia and of the vessel walls. Slight general peripheral infiltration, a little more evident on the lateral and posterior aspects of the cord.

In all of the above cases the lesion conformed in general terms to that most commonly found in syphilis, namely, a meningomyelitis. It will be noted, however, that in Case I, the meningitis was only moderate in degree, relatively slight in the cervical region, but marked in the lumbar region; while in Cases II and III the involvement of the membranes and vessels was everywhere pronounced. It is noteworthy further that in all of the cases there was a decided involvement of the pyramidal tracts, which involvement was far in excess of the involvement of any of the other tracts. This excess of pyramidal tract disease was especially striking in Case I (see Figs. 1 and 2); though noticeable in Case III, the difference between the pyramidal and general peripheral involvement was not as marked. It would seem almost as though some selective action had taken place in favor of disease of the pyramidal tracts. The lesion in each instance was inflammatory in character, and was evidently secondary to a preexisting syphilitic disease of the membranes and vessels.

It will be recalled also that in Cases I and II atrophic changes in the muscles had begun, which strongly resembled those seen in amyotrophic lateral sclerosis. That spinal syphilis now and then simulates amyotrophic lateral sclerosis is, of course, well known. In the present instance the atrophic changes are probably to be attributed to involvement of the motor root fibers rather than to involvement of the anterior cornua, though in Case I there seems to have been some diminution in the number of cells in the anterior cornua in the antero-median group in the cervical region.

Cases I and II, save in the presence of a spastic paralysis, in no way resemble the form of spinal syphilis known as Erb's syphilitic spinal paralysis. Case III, however, presents clinically a distinct resemblance to Erb's form, though it cannot be regarded as a typical instance. Erb's form, it will be remembered, is a symptom group in which the patient presents spastic paresis of the lower extremities, spastic gait, moderate loss of power, moderate or no rigidity of the affected muscles, exaggerated tendon reflexes, disturbances of sensation slight or absent, and weakness of the bladder. The upper extremities, the brain, cranial nerves and the pupils present no symptoms. However, as Nonne has pointed out, Erb's symptom-group embraces a series of most divergent cases. Thus there are on the one hand cases which present an almost pure picture of spastic spinal paralysis, *i. e.*, cases in which there is spastic paresis of the lower extremities of slow development, and with slight contractures, changes of sensation exceedingly slight or absent, and almost completely normal bladder and sexual functions. On the other hand, there are cases in which a motor paraplegia appears, relatively rapidly, and in which there are objective sensory changes, decided impairment of sexual power and of the function of the bladder; later there may be also a secondary cystitis and even decubitus. The time of appearance of the symptoms also varies greatly—for instance, from three to twenty years. Erb, as late as 1902, in his address before the Post-Graduate College in London, expressed the opinion that the symptom group described by him under the term syphilitic spastic paralysis constituted a system disease. He cited four autopsies—namely, one by Westphal, one by Eberle, one by Nonne and one by Williamson—in support of his position. The findings were practically those of a combined system disease, that is, involvement of the pyramidal and direct cerebellar tracts, with a less involvement of posterior tracts—sometimes of the columns of Goll and sometimes the columns of Burdach as well. Nonne has also placed upon record a case which revealed a myelitic degeneration from the eighth to the eleventh dorsal segment, but in addition a combined system disease, above and below. Other cases, such as those of Strümpell, Williamson, Long and Wiki, are also cited by Erb. They were likewise cases in which the picture was not exclusively one of combined system disease, but also of more or less marked degeneration in the dorsal cord, so that it was difficult to determine how much was primary degeneration and how much was secondary. Nonne, after a review of the pathological changes in Erb's symptom-group, sums up the possible anatomical findings as follows: First, a chronic transverse myelitis with ascending and descending degeneration; second, a chronic transverse myelitis with a primary degeneration of the pyramidal tracts; third, a chronic transverse myelitis alone, which is either accompanied or unaccompanied by disease of the vessels of the spinal cord.

While the existence of Erb's symptom-group of syphilitic spastic spinal paralysis must unquestionably be conceded—for every nervous clinic and every large nervous hospital ward presents a number of such cases—it must be admitted on the other hand that a corresponding and constant anatomical lesion has not been found. Erb is inclined to consider the affection as a post-syphilitic toxic disease, analogous to locomotor ataxia, but in view first of the ill-defined limitations of the symptom-group itself and of the admittedly variable character of the post-mortem findings, we cannot but regard this position with doubt. Indeed, we are inclined to agree with Oppenheim, Leyden and Goldscheider, Bruns, Reiner, Orlowsky and Korniloff, and Marie, who regard Erb's form as merely a stage of syphilitic meningo-myelitis, and who see in it nothing more than a transverse syphilitic myelitis. That an examination of the cord in late cases of this form of disease may, as Oppenheim has pointed out, reveal but little change in the membranes, goes without saying; while at the same time the changes in the columns may be pronounced and permanent. Furthermore, to suppose that the post-syphilitic toxin would in one instance give rise to tabes dorsalis, and in another to an entirely different disease, introduces a new difficulty. The one spinal disease of post-syphilitic, or para-syphilitic origin, is beyond all question tabes; it is the posterior columns upon which the suppositious toxin expends its energy. Again, the evidence at hand is overwhelming to the fact that syphilis in the pretoxic stage, that is, during its activity as an infectious process, invades the cord through the membranes and vessels. It is true that the membranes and vessels may be only slightly involved, or, perhaps, as is claimed, escape, while the cord itself becomes the seat of specific infiltration. Further, it would almost seem that syphilis during the infectious stage affects by preference the motor pathways, *i. e.*, the pyramidal tracts, not only the crossed pyramidal tracts but the direct pyramidal tracts as well, together with possible ascending and descending degenerations. How this tendency to excessive involvement of the pyramidal tracts arises, must for the present remain a matter of speculation. That it is a distinct element in syphilitic spinal paralysis the evidence appears most clearly to show, and that it is not dependent upon mere peculiarities of blood supply or relative anatomical position of the tracts within the cord is proven by the fact that the same predominence of lateral tract involvement is not noted in other forms of infectious myelitis.